

What is claimed is:

1. A filter protection apparatus, comprising:

a frame of a closed curve defining an inner space isolated from surroundings, the frame having a shape of a filter securing part for securing an air filter;

an attaching part for attaching the frame to the filter securing part;

and

a protection part, which is coupled on the inner surface of the frame to occupy the inner space with a plurality of minute holes through which air passes, for protecting the filter from damage.

2. The filter protection apparatus as claimed in claim 1, wherein

the frame comprises:

a rectangle shape having a pair of first members, each having two ends, disposed parallel to a longitudinal direction, and a pair of second members, each having two ends, disposed parallel to a latitudinal direction, which is perpendicular to the longitudinal direction.

3. The filter protection apparatus as claimed in claim 2, further comprising:

a moving member is disposed parallel to the latitudinal direction of the frame for moving within a predetermined distance parallel to the longitudinal direction of the frame, wherein the attaching part is coupled to the moving member to cause the attaching part to move together with the moving member.

4. The filter protection apparatus as claimed in claim 3, wherein both of the pair of first members have ends that are cut off with a predetermined depth from an outer surface thereof and a predetermined length towards the second member to form a notch having a first sectional surface facing an inner surface of the second member and a second sectional surface perpendicular to the first sectional surface, so that the frame includes a groove defined by the inner surface of the second member, the first sectional surface and the second sectional surface of the first member, and the moving member is disposed in the groove.

5. The filter protection apparatus as claimed in claim 4, wherein the moving member comprises:

a body that crosses the inner space parallel to the second member;

and

a pair of leg portions coupled to the body and disposed in the groove having a width less than a length of the groove,

wherein the attaching part is secured to a bottom surface of the leg portion parallel to an upper surface of the first member facing the filter, so that the attaching part moves along the longitudinal direction of the frame as the moving member moves along the longitudinal direction of the frame within the groove.

6. The filter protection apparatus as claimed in claim 5, further comprising:

a first supplementary member installed on a lower surface of the first member, which is opposite to an upper surface of the first member, wherein the first supplementary member includes:

a first face defined by a first normal vector having a direction of a normal vector of the outer surface of the first member, and

a second face defined by a second normal vector having a direction of a normal vector of the first sectional surface of the first member; and

wherein the moving member is movably coupled to the second face of the first supplementary member by a connecting part.

7. The filter protection apparatus as claimed in claim 6, wherein the connecting part is an elastic member that is deformable along the longitudinal direction of the frame by an elastic force thereof.

8. The filter protection apparatus as claimed in claim 6, wherein the connecting part is a linear spring.

9. The filter protection apparatus as claimed in claim 6, further comprising:

a second supplementary member coupled to a lower surface of the second member parallel to the second member for absorbing an impact on the frame by the moving member.

10. The filter protection apparatus as claimed in claim 9, wherein the second supplementary member comprises:

a plurality of second protruding parts coupled to an inner surface of the second supplementary member, the second protruding parts being inserted into an outer surface of the body of the moving member to cause the moving member to move parallel to the second supplementary member.

11. The filter protection apparatus as claimed in claim 6, wherein the first supplementary member comprises:

a first protruding part, which is coupled to the first face for preventing the frame from moving toward the filter, for maintaining a predetermined distance between the protection part and the filter.

12. The filter protection apparatus as claimed in claim 11, wherein the first protruding part is movably coupled to the first supplementary member.

13. The filter protection apparatus as claimed in claim 5, wherein the moving member comprises:

a power provider for providing the moving member with power.

14. The filter protection apparatus as claimed in claim 13, wherein the power provider is a handle coupled to an inner surface of the moving member for transferring a human power of an operator to the moving member.

15. The filter protection apparatus as claimed in claim 1, wherein the protection part is formed on aluminum, and the frame is formed of stainless steel.

16. The filter protection apparatus as claimed in claim 3, wherein the attaching part comprises:

a securing area secured on a bottom surface of a leg portion of the moving member;

a frame area corresponding to a projecting surface of the second member on a Z-axis; and

a catch-on area for directly contacting the filter securing part to catch the filter securing part, thereby catching the frame on the filter securing part.

17. The filter protection apparatus as claimed in claim 2, wherein the protection part comprises:

a filter protection net having a plurality of holes through which filtered air passes.

18. The filter protection apparatus as claimed in claim 17, wherein the protection part further comprises:

at least one guide, which is installed across the inner space of the frame parallel to the second member, for preventing the filter protection net from sagging down for maintaining a tension of the filter protection net.